



Figure 1.

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Table 1a.

**VCU IN VESSEL COMPOST SYSTEM**  
**Physical And Thermodynamic Model**

VCU # Panels (One Side)	2.2 m
Putrescible % of Total	50 %
Putrescible % Solids (w/w)	25 %
Greenwaste Moisture Content	50 %
Primary Chamber Output MC	30 %
Bulk Density Greenwaste Input	0.30
Density Sludge Dry Solids	0.83
Ambient Temperature	14 Deg C
Column Zone Temperatures	
Zone A Temp(Measured)	80 Deg C
Zone B Temp(Measured)	75 Deg C
Zone C Temp(Measured)	67 Deg C
Zone D Temp(Measured)	45 Deg C
Ultimate Analysis For C & H	
Carbon %	49 %
Hydrogen %	9 %
Average Temperature Rise	52.75 DegC
Ambient	14 DegC

**VCU MODEL 20S**

Client:

NSW University

Code: UNI

File Version: 2

Column Hgt	5 m
Product MC	45 %
Condensate	8 L/m3/day
Cycle Time	14 Days
	126.95 Degf
	57.2 Degf

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Table 1b.

VCU IN VESSEL COMPOST SYSTEM

VCU DATA				
Volume (Main Chamber)	24 m3	24 m3	1.73	
Daily Mass Greenwaste (wet)	1,162 lbs	519 kg	(m3/day)	
Daily Mass Sludge (wet)	1,162 lbs	519 kg		
Daily Mass Total (Wet)	2,323 lbs	1,037 kg		
Plenum Loading	3.24 psi	0.29 Kg/cm2	Total Ground Loading(kg) 13,501	
Mass of Water	1,452 lbs	648 kg		
Dry Mass Total	871 lbs	389 kg		
Overall Moisture Content	62.50 % (w/w)	62.50 % (w/w)		
Total Energy In Column	2,773,766 btu	2,926 MJ	31,213	
Energy Use (Heating/Evaporation)	81,519 btu/hr	23 Kw/hr	67,932	
Oxygen For Microbe Energy	25.36 lbs/hr	11.32 Kg/hr		
Oxygen Excess	0.76 lbs/hr	0.34 Kg/hr		
Total Oxygen In	26.12 lbs/hr	11.66 Kg/hr		
Nitrogen In	98 lbs/hr	44 Kg/hr		
Total Air Required	124.39 lbs/hr	55.53 Kg/hr		
Specific Air Volume Per Hour	64.17 scf/m3	1.89 scm/m3	634	
Fan Spec @ 3" swg	42.63 scfm	1.25 scm/min	0.05	
Daily Water Input	1,452 lbs/day	648 Kg/day		
Daily Water Evaporation	1,149 lbs/day	513 Kg/day	5.65%	
Daily OD Solids Loss	163 lbs/day	73 Kg/day	1.34%	
Predicted Stack Temperature	63 Degf	17 DegC		
Column Velocity	0.842 f/min	0.259 m/min		
Column Velocity	0.014 f/sec	0.004 m/sec		
OD Solids Loss Rate	7 lbs/hr	3 Kg/hr		
OD Solids Loss	7 lbs/m3/Day	3 kg/m3/D		
Water Reduction	47 lbs/m3/Day	21 kg/m3/D		
Daily Drop	1.53 m3 (Est)	452 kg		
Check Digits	355.13	0.158	6.79	
Microbe Fuel Consumed (Primary Chamber)	lbs/hr	moles	scfm	acfm
Carbon	5.435	0.453		
Hydrogen	1.359	0.679		
Oxygen Required	25.361	0.793	4.742	5.382
Excess Oxygen	0.761	0.024	0.142	0.161
(Evaporation) H2O	47.854	2.659	15.907	18.052
(Oxidation) H2O	10.869	0.604	3.613	4.100
CO2	14.492	0.329	1.971	2.237
N2	98.270	3.510	20.999	23.831
Stack Products From Oxidation	172.246	7.125	42.632	48.220
				Stack Gas 0.44%
				8.41%